

Chemical modification of polysulfone: Composite anionic exchange membrane with TiO₂ nano-particles

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Abstract

Synthesis of quaternary polysulfone/Titanium dioxide (QPSf/TiO₂) nanocomposite membranes by the recasting procedure as suitable electrolyte in alkaline fuel cells is described. The composite membranes were characterized by ionic conductivity measurements, TGA, SEM, XRD, and AFM. Thermal analysis results showed that the composite membranes have good thermal properties. The introduction of the inorganic filler supplies the composite membrane with a good thermal resistance. The physico-chemical properties studied by means of SEM and XRD techniques suggested the uniform and homogeneous distribution of TiO₂ at 2.5 wt.% loading, and negligible agglomeration at 10 wt.% loading, also indicated enhancement of crystalline character of these membranes. The energy dispersive X-ray spectra (EDS) analysis gave proportional percentages that the distribution of Titania element on the surface of the composite membrane was uniform. Observations from the results suggest that QPSf/TiO₂ nanocomposite membranes have good prospects for possible use in AFC.